

VynEL™ ILLUMINATED LIGHTING

WEARABLE DESIGN GUIDE

This guide covers technology fundamentals, design considerations, integration methods, and key decisions for integrating VynEL™ into wearables, consumer products, and architectural applications. Use it to fast-track your project from concept to production. Contact info@ellumiglow.com at any step.

1. TECHNOLOGY OVERVIEW

What is VynEL™?

VynEL™ derives from electroluminescent (EL) phosphor technology built with aerospace-grade materials. Compared to standard EL panels, VynEL is 2-4x brighter, significantly more flexible, and available in a far broader range of customization options. The panel emits an even, soft glow when AC voltage is applied through an inverter.

How Is It Made?

VynEL is produced using a screen-printing process across 5 stacked layers. Custom designs are produced to client spec, with screens maintained for the project's lifetime (up to 10 years). Maximum single panel size: 31" x 64" (78 x 163cm). Custom die-cut shapes are supported.

Operating Requirements

VynEL requires an EL inverter to operate. Inverters convert DC battery power to the AC voltage and frequency required by the EL phosphor. Off-the-shelf inverters work well for prototyping. For production, a custom-tuned inverter is recommended: it reduces noise up to 95%, extends panel life, and ensures optimal brightness.

Power Consumption

VynEL panels draw 5-15 mA per square inch. Total power consumption scales linearly with lit area. Battery selection depends on total illuminated area and required run time. The lit area alone determines power draw; unlit areas within a panel do not consume power.

2. BRIGHTNESS AND DESIGN EXPECTATIONS

VynEL™ outputs 250-400 cd/m² depending on variant and frequency. Standard EL panels measure 100-150 cd/m²; LED strip lights measure roughly 600 lumens per meter. VynEL falls between these two, closer to LED brightness in low-light conditions while maintaining full flexibility.

VynEL is not designed to compete with daylight or primary illumination sources. It is best applied as accent, safety, or atmospheric lighting where the user directly views the light source. High-visibility safety seams, illuminated logos on stage costumes, lit trim on automotive interiors, and glow-accented camping gear are all strong use cases. Attempting to use VynEL as a floodlight or headlight replacement is not appropriate.

Design to the strength of the technology:

VynEL is ideal where the viewer recognizes and embraces the light source: safety visibility, stage performance, branding at events, low-light navigation, and high-design product illumination. It is not suitable where the goal is to flood an area with directional light.

3. DESIGN PROCESS

Size

Lit area is the primary driver of every other design decision. Larger panels require bigger inverters, larger batteries, and more space for components. In wearable applications, keeping total lit area under 30 sq in (1 sq ft) is practical for most designs.

Shape

VynEL is not limited to rectangles. Disconnected lit zones on a single panel do not need to be adjacent to share a single power connection. A graphic that lights up only the logo area consumes less power than lighting the full panel background.

Flexibility

Select variant by end-use environment:

Variant	Thickness	Best Use Case
VynEL™ Flow	0.25-0.5mm	Soft, ambient lighting
VynEL™ HD	0.5-0.8mm	Outdoor, high-contrast
VynEL™ Splash	1-1.6mm	High-contrast, directional

Color

Phosphors emit naturally in teal blue or white. Filters produce additional colors. Teal-base phosphor (Vibrant Blue) outputs 350-400 cd/m²; white-base outputs 250 cd/m². Blues, pinks, and greens work best on teal base. Reds, purples, and warm tones are better on white base.

Power Reference

Area (sq in)	Est. Current Draw
1-5	5-75 mA
5-15	25-225 mA
15-30	75-450 mA
30+	150mA+

4. INTEGRATION METHODS

Heat Bonding: Front Bond

A slit is cut in the fabric for the wiring. The heat bond adhesive is applied to the back of the panel and the full panel bonds to the garment front. Easier in manufacturing but the panel border is visible. A secondary fabric layer can be added around the edges for a cleaner finish.

Heat Bonding: Back Bond

A window is cut in the fabric and the panel bonds from behind, showing only the lit face from the front. More professional finish, more manufacturing time. Recommended for production-grade garments.

Heat Press Settings

300°F / 30-40 lbs pressure / 15-20 seconds. Keep the lighting element furthest from the heating element. After pressing, allow the garment to cool 1-2 minutes before peeling the release layer.

Sewing

Do not sew through the active panel area. Ellumiglow can produce panels with a non-conductive border for sewing attachment. Sewing provides more rigidity around the panel edges than heat bonding.

Adhesive (Hard Surfaces)

For automotive panels, dash clusters, rigid walls, and non-textile surfaces, pressure-sensitive adhesives provide strong hold. VynEL Cling uses a wrap-style PSA for vehicle application.

Design Process Flow

Panel Design	Shape, size, color, lit zones
Inverter Design	Tuned to panel spec
Connector	Wiring interface
Cabling	Routing and protection

5. SAFETY

Electrical Safety

VynEL operates at low current. Shock risk is low under normal use. All connection points must be fully insulated with heat shrink or silicone before the product is worn. Do not leave exposed conductor at connectors. Custom inverters further reduce panel and inverter noise and are recommended for all production applications.

Connector Selection

Two primary options: hardwired (no connector) for permanent integration, or detachable waterproof connector for applications where the battery is removed for washing or maintenance. Larger connectors are more robust but more visible. Specify low-profile connectors for garments where the connection point is concealed.

Water Exposure

HD is rated for 25 machine wash cycles cold. Remove all inverter and battery components before washing. Flow and HD variants use Ripcord™ waterproof silicone-wrapped cable for applications with regular wet exposure such as backpacks, tents, and jackets.

Cabling

Ripcord™ is Ellumiglow's water-resistant silicone-wrapped cable for wearable integration. It can be heat-bonded with seam tape to conform to the shape of a garment, keeping wiring flat and integrated rather than running loose inside.

LEARN MORE

Full guides, wiring diagrams, integration tips, and product specs: ellumiglow.com/pages/el-guide